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Cactus: an unlikely fodder solution?



Opuntia ficus-indica requires very little water to survive.
credit: ICARDA

Unlike its spiky cousins, the prickly pear cactus *Opuntia ficus-indica* is spineless and offers several benefits to both man and livestock. Although it originated in the deserts of Central and North America, this particular species of cactus has long been domesticated and is an important crop in many arid and semi-arid parts of the world.

Farmers in Tunisia have grown prickly pear for centuries in the desert. Besides its potential to provide a wide variety of products from soap to medicine, these cacti have been used to halt encroaching desertification, as a wind barrier, to enhance soil structure and, importantly for poor livestock keepers, to provide water and feed for animals.

In the bleak tracts of this north-African country, the unforgiving red sand dunes are home to populations of once nomadic pastoralists. As a result of conflict in the region and the need to access permanent shelter, education and water, these people have been forced to abandon their traditional migration patterns and adopt a sedentary way of life. The results of this change have been increasing overgrazing and desertification; with nowhere else to go, these livestock keepers are faced with shortages of feed and water for their livestock.

Providing food and water

Resistant to high temperatures and able to survive with little and erratic rainfall, cacti can thrive in the most arid conditions where nothing else will grow: in central and southern Tunisia, cactus plantations provide large amounts of fodder for livestock and play a key role in natural resources conservation. The plants contain a high percentage of water - up to 90 per cent when fresh - and research has shown that, when fed to livestock, water requirements can be reduced by 40 to 100 per cent.

Tunisia is not the only country where cactus cropping is important. As part of the eight-country Mashreq/Maghreb Project, the International Center for Agricultural Research in the Dry Areas (ICARDA) has been investigating cactus cropping and its uses at pilot sites in Algeria, Libya and Morocco as well as Tunisia. The results have led to a major expansion in planting cactus to provide livestock feed, improve degraded rangelands, halt erosion and increase soil cover. Community surveys have shown that not only has cactus expansion been successful, but cactus fodder has improved livestock productivity and kept flocks alive throughout the year.



Farmers prefer to cut the cactus into smaller pieces and supplement with hay or straw.
credit: ICARDA

Need for supplementation

However, despite the many advantages of cactus, it does not provide a balanced feed: while the plants are high in carbohydrates and vitamin A, protein content is only about five per cent and phosphorous and sodium levels are also low. To provide a nutritional balance, farmers are encouraged to grow leguminous fodder shrubs such

as the salt bush (*Atriplexnummularia* or *A. halimus*) which is also capable of withstanding harsh conditions.

The Mashreq-Maghreb project has also introduced alley-cropping techniques to farmers, with cereal or legume pasture crops grown between rows of cactus. Two years after cactus alley-cropping was introduced in a pilot community in Tunisia, adoption rates were shown to be over 30 per cent. Farmers were able to reduce their feed costs by 13 per cent and increase their incomes by seven per cent. Soil nutrients - organic matter, carbon, phosphorus, potassium - also increased.

While animals are able to graze directly on cactus plantations, rotation of fenced areas has to be managed to avoid overgrazing and damage to young plants. Many farmers prefer and are encouraged to cut the cactus into smaller pieces and supplement with hay or straw. The 'cladodes', the fresh cactus pads or water storing segments of the plant, are rich in easily fermentable carbohydrates which aid digestion in the rumen.

Sharing lessons learned



Cactus fodder has improved livestock productivity throughout the year.
credit: ICARDA

As a result of ICARDA's collaborative work on cactus, the experience and lessons learned from technologies are generating benefits elsewhere, including in Lebanon, Syria, Jordan, Iraq, Oman, Pakistan, Central Asia and the Caucasus.

In Mauritania, cactus plantations are also being established and a special programme provides support to poor women to grow cactus in family gardens.

Poverty and environmental degradation are intertwined in the low rainfall areas of West Asia and North Africa - the WANA region - where more than 38 million people live in rural areas and are dependent on agriculture. By increasing and stabilising fodder reserves, *Opuntia* has been shown to effectively mitigate the effects of drought on poor livestock keepers and reduce the risks faced by these dryland farmers.

In a region that will continue to struggle with two of the world's biggest environmental challenges, desertification and climate change, this multi-purpose plant provides a viable option for communities seeking to grow crops and sustain livestock on marginal or degraded land with very few inputs.

